SYLLABUS

SOFTWARE DEVELOPMENT · COURSE HANDOUT 2026

BACKEND APIS

EST . GRAPHQL . WEBHOOKS
AUTH . VALIDATION . RATE L
HING . QUEUES . DOCUMENT

DURATION	LEVEL	MODULES	MODE
60 Hours	**Intermediate**	**8**	**Classroom · Online · Hybrid**

01 COURSE OVERVIEW

A backend engineering course focused on designing and operating APIs that other teams consume. The course covers API design as a contract: resource modelling, versioning, error semantics, pagination, idempotency and documentation. Operational concerns — caching, queues, rate limiting, observability — get equal weight.

Learners build and document a production-shaped API with authentication, background jobs and a published OpenAPI specification.

WHO IT IS FOR

- Backend developers
- Full stack developers formalising API skills
- Integration engineers
- Technical leads defining API standards

PREREQUISITES

One server-side language, SQL basics and HTTP fundamentals.

02 LEARNING OUTCOMES

01 Design resource models and consistent URL schemes.

02 Choose between REST, GraphQL and event-driven styles.

03 Implement robust authentication and authorisation.

04 Validate input and return meaningful errors.

05 Cache responses and paginate large collections.

06 Offload work to queues and background workers.

07 Document and version an API for external consumers.

03 MODULE STRUCTURE

8 MODULES

01 HTTP AND API STYLES

HTTP methods and status codes

Headers

Content negotiation

REST constraints

RPC

GraphQL

Event-driven

02 RESOURCE DESIGN

Modelling resources

URL structure

Filtering and sorting

Pagination

Partial responses

Idempotency keys

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API CONTRACT

03 VALIDATION AND ERRORS

- Schema validation
- Problem details
- Time and locale handling
- Error envelopes
- Retry semantics

04 AUTHENTICATION AND AUTHORISATION

- API keys
- JWT
- Scopes
- OAuth 2.0 flows
- Refresh tokens
- Multi-tenant access

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OAUTH-PROTECTED ENDPOINTS

05 DATA AND PERFORMANCE

- Query optimisation
- Caching layers
- Compression
- N+1 problems
- ETags
- Connection pooling

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CACHED ENDPOINT

06 ASYNCHRONOUS WORK

- Queues
- Retries and dead letters
- Webhooks and signatures
- Workers
- Scheduled jobs

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BACKGROUND PROCESSING

07 GRAPHQL

- Schema and types
- Queries and mutations
- Auth in GraphQL
- Resolvers
- N+1 and dataloaders

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GRAPHQL LAYER

08 OPERATIONS AND DOCUMENTATION

- OpenAPI
- Versioning and deprecation
- Logging and tracing
- SDK generation
- Rate limiting
- SLOs

PROJECT

DOCUMENTED PRODUCTION API

04 ASSESSMENT & CERTIFICATION

Module assignments and labs	**25%**
Mini projects	**20%**
Internal assessments	**15%**
Final project and review	**40%**

CERTIFICATION

Learners who complete all modules, submit the final project and clear the review receive a course completion certificate from Kaizen Infinities Private Limited. Project work is documented for the learner's portfolio, and interview preparation is included in the closing sessions.

05 CAREER OUTCOMES

ROLES THIS PROGRAMME PREPARES FOR

BACKEND DEVELOPER **API ENGINEER** **INTEGRATION ENGINEER** **PLATFORM ENGINEER** **SOFTWARE ENGINEER**

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